

# PATENT SPECIFICATION

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## DRAWINGS ATTACHED

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## (54) IMPROVEMENTS IN OR RELATING TO SAFETY CLOSURE FOR CONTAINERS

(71) I, LLOYD STANLEY TURNER, of 50 Chetnut Street, Los Gatos, State of California, United States of America, a citizen of the United States of America, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to bottles and like containers for the storage of drugs, medicine and other potentially dangerous substances; and more particularly, this invention relates to safety caps for such containers.

In the present day households it is customary to store medicine and other dangerous substances in medicine cabinets or the like which are normally high and out of the reach of children. However, children are known to climb and gain access to such places and to consume the medicine and tablets therefrom. It is desirable to further protect children from medicine and drugs by the use of containers having safety caps which may be removed by manual dexterity and by special procedures which are within the capabilities of adults but which are beyond the capabilities of the small children.

It is an object of this invention to provide an improved safety closure for a bottle or like container; and more particularly, it is an object to provide a safety closure wherein an outer ring or collar must first be rotated to an alined position and thence may be shifted axially to release a constriction on an inner cap which may then be pressed upwardly over an enlarged lip of the bottle for removal.

It is a further object to provide an improved closure for a bottle including a pliable cap and an outer ring thereon, wherein a cap and the outer ring contain mating parts to permit the cap to rotate to an alined position wherein the outside ring may be moved axially to release a constriction on the pliable inner cap permitting the inner cap to be likewise pressed over the enlarged lip of the bottle such that the whole assembly, cap and outside ring, may be removed.

According to the invention there is provided a container and a safety closure therefor comprising a cap member and an outer ring member, said container having a circular mouth opening with an enlarged lip therearound, said cap member having an inwardly extending lip for engaging the lip of the container and thereby securing the cap member on the container, said cap member being pliable and capable of being pressed over the enlarged lip of the container, said outer ring member being positioned around the cap member to hold the cap member in constriction about the lip of the container, said cap member and said outer ring member having complementary parts for permitting rotational movement of the outer ring member with respect to the cap member, said complementary parts including a circumferential groove formed in a first of the members and a key extending radially from the other member into said circumferential groove of the first member, said first member having a keyway extending axially from the circumferential groove for permitting axial movement of at least a portion of the outer ring member when the outer ring member is rotationally positioned such that the key and keyway are alined, said axial movement of the outer ring member effecting the release of said cap member from constriction to allow the lip of said cap member to be deflected by the enlarged lip of the container for removal therefrom.

The invention will now be described in greater detail by way of example with reference to the accompanying drawings wherein,

Figure 1 is an exploded view of one embodiment of this invention wherein the parts are shown in perspective;

Figure 2 is a vertical section of the first embodiment with the safety closure secured over a bottle;

Figures 3A and 3B are similar top or plan views of the first embodiment showing the parts in two different rotational positions;

Figures 4A, 4B and 4C are similar enlarged fragmentary sectional details of Figure 2 show-

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ing the closure in various stages of removal from a bottle;

Figure 5 is an exploded view of the second embodiment of this invention wherein the parts are shown in perspective;

Figures 6A and 6B are similar vertical sections of the second embodiment showing the closure is secured upon a bottle and removed from the bottle;

Figures 7A and 7B are similar top or plan views of the second embodiment wherein the parts are shown in two different rotational positions.

Figures 8A, 8B and 8C are enlarged sectional details of figure 6A and 6B showing the closure in various stages of removal from the bottle;

Figure 9A is a top or plan view of a cap member for a third embodiment of this invention;

Figure 9B is a similar top view of the third embodiment showing the cap assembled with an outer ring member;

Figure 10 is an exploded view of the third embodiment wherein the parts are shown in perspective;

Figure 11 is a vertical sectional view of the third embodiment wherein the safety closure is shown in the process of being removed from a bottle;

Figure 12A is a plan view of the bottle cap for a fourth embodiment of this invention;

Figure 12B is a similar plan view of the fourth embodiment showing the cap and the outer ring assembled;

Figure 13 is an exploded view of the fourth embodiment of this invention wherein the parts are shown in perspective; and

Figure 14 is a vertical section of the fourth embodiment wherein the safety closure is shown in the process of being removed from the bottle.

For purposes of this patent application it will be assumed that the bottles or like containers stand upright with the safety closures thereover. The positioning of the parts will be described with relation to the axis of the bottle. Thus the term "axially" will mean either upwardly or downwardly; and the term radially will mean either inwardly towards the axis or outwardly away from the axis of the bottle in its upright position.

Briefly stated, according to this invention, a safety closure for a bottle 21 includes a cap 22 of pliable material and an outer ring or collar 23. The cap 22 includes one or more keys or outward protrusions 24. The outer ring 23 contains a circumferential groove 25 extending completely around the inner surface therein and positioned to receive the outwardly extending keys 24 from the cap member 22. The groove 25 provides a circular guideway through which the keys or protrusions 24 may slide such that the outer ring 23 will be rotatable about the cap 22. One or more keyways

26 extend axially from the circumferential groove 25 of the outer ring member 23. When the parts are rotationally aligned, the outer ring member may be moved axially such that the key 24 of the cap 22 will move into the recesses or keyways 26 of the outer ring or collar 23.

As shown in figure 2, the bottle or container 21 has an opening or mouth 27 with a lip of enlarged diameter 28 extending therearound. The cap 22 contains an inwardly extending lip or bead 29 which is secured below the lip 28 of the bottle 21. The cap 22 is of a pliable plastics material and may be pressed outwards and deformed to seat over the enlarged lip to secure the cap 22 upon the bottle 21. The outer ring 23 encircles and constricts the cap 22 thereby securing the cap upon the bottle by preventing the cap from expanding. As shown in figures 3B and 4A, the outer ring 23 is randomly positioned with respect to the inner cap 22; and the keys 24 are not in alignment with the keyways 26. Since the outer ring 23 is rotatable over the cap 22 the cap and the outer ring may be brought into a position of rotational alignment as shown in figures 3A and 4B. Thus in figures 3A, the keyways 26 are positioned to receive the keys 24. Similarly it may be noted in figure 4B that the keyway 26 is brought to a position immediately above the key 24. With the parts in rotational alignment, the outer ring member 23 may be depressed downwardly as shown in figure 4C and thence the cap 22 may be pressed upwardly over the enlarged lip 28 of the bottle 21 for complete removal therefrom. Thus it will be appreciated that in the first embodiment of this invention the security cap may be removed by first rotatably aligning the outer ring with respect to the cap 22, and thence depressing the outer ring 23 and raising the cap 22.

The second embodiment of this invention as shown in figures 5 through 8 is similar to the first embodiment except that the keyways 26 extend downwardly from the circumferential groove 25 rather than upwardly as shown in the first embodiment. Figure 6A shows the assembled parts in section with the bead 29 of the cap 22 secured below the enlarged lip 28 of the bottle 21 and with the outer ring 23 constricting the cap therein to prevent the cap from expanding and being pressed over the lip 28 of the bottle 21. Figure 7B shows the parts in random rotational positions wherein the safety closure is in a secured position. To remove the safety closure, the outer ring 23 must be rotated to bring the keys 24 and keyways 26 into alignment as shown in figure 7A. Figure 8A shows the parts in misalignment or randomly aligned with respect to each other such that the keys 24 extend into a circumferential groove 25 and prevent the outer ring member 23 from moving in an axial direction. Figure 8B shows the parts aligned with the key-

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ways 26 situated immediately below the key 24 such that the outer ring member 23 may be raised. Figure 8C shows the method of removal of the safety closure assembly of this embodiment removed by pressing the whole assembly upwardly as a unit. It may be noted that the outer ring member 23 has shifted upwardly with respect to the cap 22 with the key 24 dropping downwardly into the keyway 26 thereby releasing the lower portion of the cap 22 from constriction. Since the cap 22 is pliable it may be pressed and deformed over the enlarged lip 28 of the bottle 21 for removal therefrom.

In the embodiment shown in figures 9A, 9B, 10 and 11, the cap contains a single key 24 on one side thereof while the other side of the cap contains a continuous flange 31. As shown in figure 10 the flange 31 and the key 24 are formed as outward extensions of the cap 22 in the same plane. When the outer ring 23 is assembled around the cap 22, the flange 31 extends substantially half way around the circumferential groove 25, and the key 24 extends into the circumferential groove at a point diametrically opposite to the center of the flange 31. As in the previous embodiments, the outer ring member 23 constricts against the cap 22 to prevent the cap from expanding over the enlarged lip 28 of the bottle 21. To remove the safety closure from the bottle, the outer ring member 23 may be rotated to a position of alinement such that certain index marks or arrows 32 and 33 on the outer ring member and on the cap are brought into alinement. When the parts are rotationally alined, the keyway 26 is in position below the key 24. In this position, the outer ring member 23 may be pressed upwardly on one side as shown by an arrow 34 in figure 11. The outer ring member 23 moves upwardly on the left side as shown in figure 11 with the keyway 26 moving upwardly to receive the key 24 whereby constriction is relieved from the lower part of the cap 22 and the bead or enlargement 29 may expand outwardly and move past the enlarged lip 28 of the bottle 21. When the bead 29 passes over the lip 28 on the first side of the safety closure, the pliable cap 22 will become loosened from the mouth 27 of the bottle and the entire closure assembly may be removed therefrom.

Figures 12A to figures 14 shows an embodiment similar to that of figures 9 to 11 except with certain parts of the cap and the outer ring 23 reversed. Both embodiments include a flange extending outwardly from the cap for substantially half of the circumference thereof. In the embodiment of figure 9 to 11 the key 24 extends into the circumferential groove 25 with regions of reduced diameter 36 and 37 on each side of the key 24. The keyway 26 of the outer ring 23 is complementary to receive the key 24. The embodiment of figures 12 through 14 the flange 31 extends substan-

tially more than half of the circumference of cap 22. However, the ends thereof 24' may be considered as extending keys which are spaced apart and are connected to the semi-circular flange 31. In this case the keyways 26 are somewhat enlarged from the prior embodiments and are spaced apart slightly to receive the keys 24' which are actually the ends of the flange 31. Obviously when the outer ring 23 is rotated into alinement with the cap 22 as shown by the indicating arrows or other indicia 32 and 33, the two flange extensions 24' which constitute the keys are positioned over the complementary keyways 26, such that the first side of the outer ring 23 shown on the left in figure 14 may be raised to release the constriction on the cap 22 thereunder. The first side of the pliable cap shown on the left in figure 14 may be pressed upwardly over the enlarged lip 28 of the bottle 21 whereupon the entire assembly of the outer ring and the cap 22 may be removed from the bottle 21.

The outer rings 23 and the caps 22 for the embodiments of figures 9 through 14 normally remain together as a unit. In the process of manufacture the two parts are molded separately and then the pliable cap is deformed and forced into engagement with the more rigid outer ring by a mechanical means using jigs or the like such that both the cap may be deformed considerably and the flange 31 and the keyways and the keys 24 may be forced into positions within the circumferential groove 25 of the more rigid outer ring. This assembly is possible because the cap is not rigid but pliable and is capable of extensive deformation. After the assembly of the outer ring 23 and the cap 22, the parts will normally remain together as shown in figures 11 and 14, even when the closure is removed from the bottle. When the keys and keyways are alined, the parts may be deformed as shown by hand pressure to effect the removal of the closure from the mouth of the bottle 21. Similarly the closure may be replaced upon the bottle by making certain that the parts are in alinement, and then pressing the parts over the bottle with the side containing the flange 31 being first pressed thereover, such that the closure of the bottle may be effected by the deformation of the parts shown in figures 11 and 14. In the case of the first embodiment of this invention shown by figures 1 through 4, the outer ring 23 may be actually removed from the cap 22 without deformation of either part. On the other hand, the embodiment shown by figures 5 through 8 requires that the pliable cap 22 be somewhat deformed in order that the outer ring may be assembled thereover.

It is contemplated that the parts for the security closure of this invention may be molded of plastic materials. Obviously the bottle 21 may be formed of glass, or alternatively the bottle may be formed of a rigid plastic

such as polystyrene or a high density polyethylene. The outer ring member 23 should likewise be molded of a rigid or a semi-rigid material such as a high density polyethylene, a polypropylene or a nylon. The cap member 22 should be of a pliable plastic such as a low density polyethylene.

As indicated heretofore, the outer ring member 23 functions to constrict the cap 24 preventing expansion thereof and thereby securing the cap over the enlarged lip of the bottle. The term constriction as used herein is not intended necessarily to mean that continuous or substantial pressure need be exerted upon the cap member 22. Indeed the cap 22 and the outer ring member 23 should fit loosely such that the outer ring member is free to rotate with respect to the cap. On the other hand the outer ring member when positioned over the cap, will not allow any expansion of the cap beyond the normal dimensions thereof. Therefore the term constriction as used herein pertains to the function of the outer ring member in maintaining the cap in a normal configuration without expansion although not necessarily by exerting continual pressure thereagainst.

An important feature of this invention resides in the fact that the cap is secured upon a bottle by an outer ring that holds the periphery of the cap while leaving the central part thereof exposed and vacant for other uses. Obviously, the top surface of the cap may contain the tradename and dosage information concerning the medicine or other products contained in the bottle. This space may also be used for printed instructions as to the method for removing the security closure from the bottle. These instructions will thus be available to adults, but will be unintelligible to preschool children.

Changes may be made in the form, construction and arrangement of the parts without departing from the scope of the invention or sacrificing any of its advantages, and the right is hereby reserved to make all such changes as fall fairly within the scope of the following claims.

#### WHAT I CLAIM IS:—

1. A container and a safety closure therefor comprising a cap member and an outer ring member, said container having a circular mouth opening with an enlarged lip therearound, said cap member having an inwardly extending lip for engaging the lip of the container and thereby securing the cap member on the container, said cap member being pliable and capable of being pressed over the enlarged lip of the container, said outer ring member being positioned around the cap member to hold the cap member in constriction about the lip of the container, said cap member and said outer ring member having complementary parts for permitting rotational movement of the outer ring member with re-

spect to the cap member, said complementary parts including a circumferential groove formed in a first of the members and a key extending radially from the other member into said circumferential groove of the first member, said first member having a keyway extending axially from the circumferential groove for permitting axial movement of at least a portion of the outer ring member when the outer ring member is rotationally positioned such that the key and keyway are aligned, said axial movement of the outer ring member effecting the release of said cap member from constriction to allow the lip of said cap member to be deflected by the enlarged lip of the container for removal therefrom.

2. A container and a safety closure therefor in accordance with claim 1 wherein the circumferential groove and the keyway extending axially therefrom is formed in said outer ring member and wherein the key is formed integrally with said cap member extending outwardly therefrom into the circumferential groove of the outer ring member.

3. A container and a safety closure therefor in accordance with claim 2 wherein said cap member includes a plurality of keys integrally formed therewith, said keys extending radially outwardly from and being spaced about the periphery of the cap member, and wherein said outer ring member includes a plurality of keyways extending axially from and spaced about the circumferential groove to correspond with the spacing of said keys, said outer ring member being rotatable with respect to the cap member to a position of alinement wherein said outer member becomes movable axially with said keyways receiving corresponding keys.

4. A container and a safety closure therefor in accordance with claim 3 wherein said keyways extend upwardly from the circumferential groove of said outer ring member such that said outer ring member may be moved downwardly to release the constriction from the cap member.

5. A container and a safety closure therefor in accordance with claim 3 wherein said keyways extend downwardly from the circumferential groove of said outer ring member such that said outer ring member may be moved upwardly to release the constriction from the cap member.

6. A container and a safety closure therefor in accordance with claim 2 wherein said keyway extends axially from the circumferential groove on a first side of said outer ring member, said outer ring member being rotatable with respect to the cap member to a position of alinement wherein the first side of said outer ring member may be axially moved to relieve the constriction on said cap member whereupon the lip of said cap member may be deflected by the enlarged lip of said con-

tainer for removal therefrom.

5 7. A container and a safety closure therefor in accordance with claim 6 comprising a flange extending outwardly from said cap member into the circumferential groove of said outer ring member, said flange being continuous around substantially one half of the periphery of said cap.

10 8. A container and a safety closure therefor in accordance with claim 7 wherein a single key extends outwardly from said cap on the first side thereof diametrically opposite from the center of the flange.

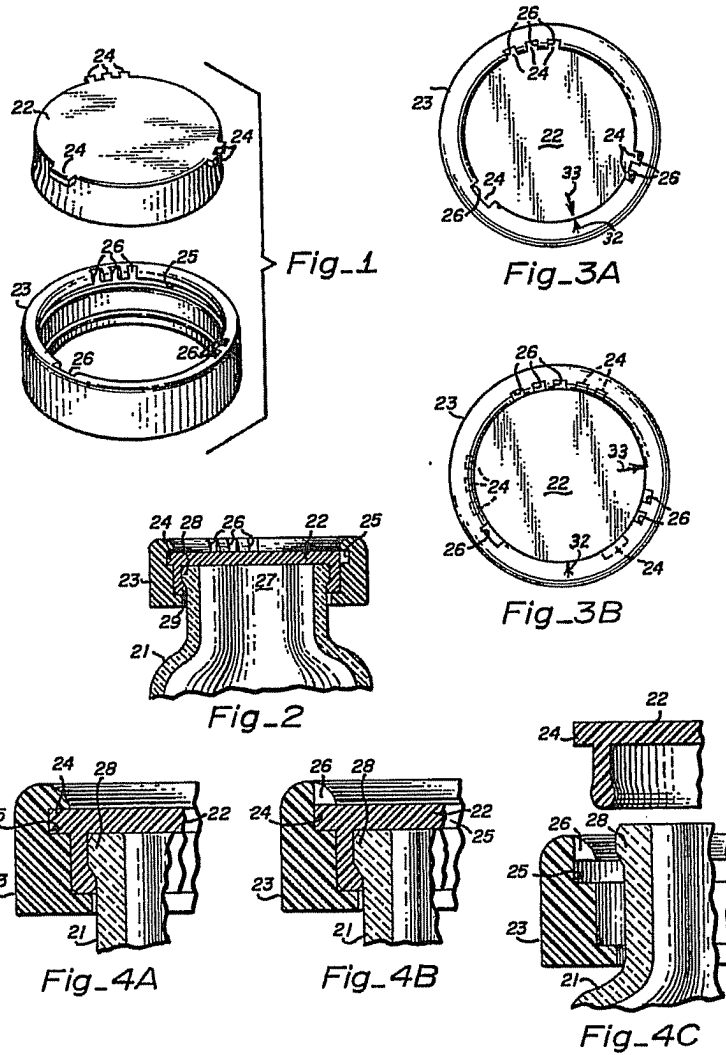
15 9. A container and a safety closure therefor in accordance with claim 7 wherein said cap

member comprises two spaced apart keys formed by extensions of the ends of the flange, and whereby said outer ring member comprises two spaced apart keyways formed by enlarging the circumferential groove over substantial portions of the first side of said outer ring member. 20

10. A container and safety closure therefore substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings. 25

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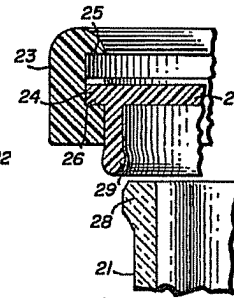
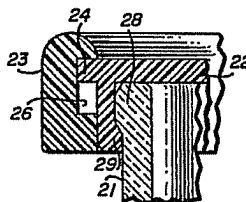
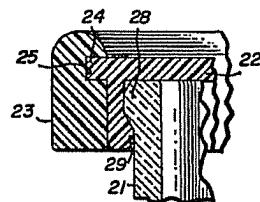
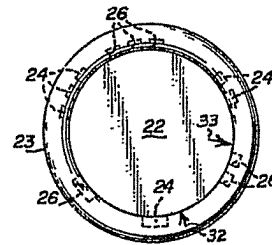
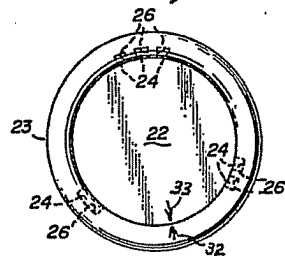
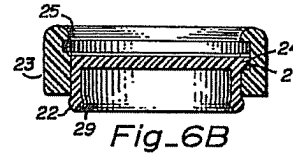
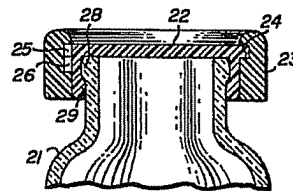
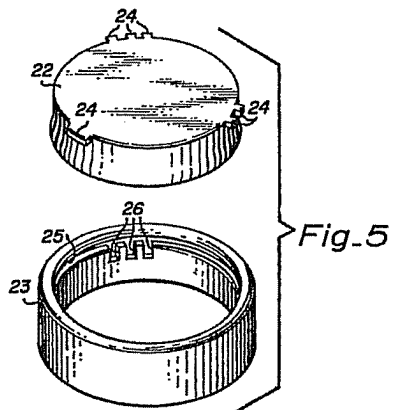
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COMPLETE SPECIFICATION

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Sheet 2



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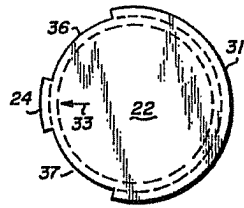


Fig. 9A

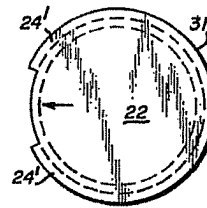


Fig. 12A

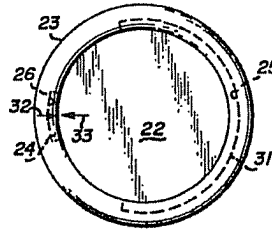


Fig. 9B

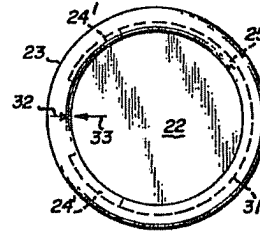


Fig. 12B

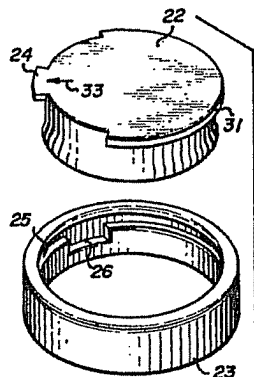


Fig. 10

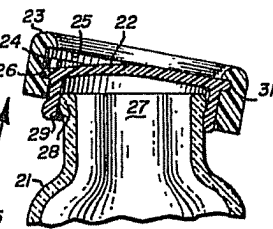


Fig. 11

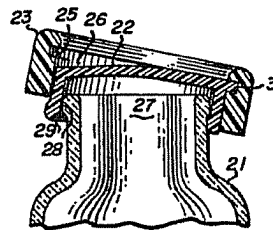


Fig. 14

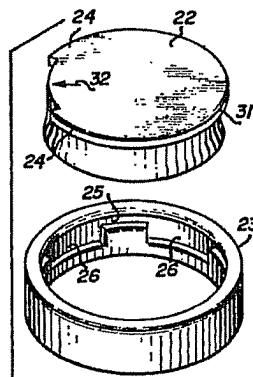


Fig. 13